

WHAT IS CLAIMED IS

1. An antenna apparatus coupled to a feeding point arranged on a cavity having surfaces, the apparatus comprising:

5           a linear element, connected to the feeding point, having a physical length from the feeding point to an end thereof is shorter than a one-quarter wavelength;

          a half-wave antenna element connected to the end of the linear element at a connecting point; and

10           a conductor piece opposing to one of the surfaces of the cavity and including the connecting point.

          2. The antenna apparatus according to claim 1, wherein the linear element includes a first portion extending in a first direction opposite to that of the half-wave element from the feeding point and a second  
15           portion extending in a second direction, which is equal to a direction in which the half-wave antenna element extends.

          3. The antenna apparatus according to claim 1, wherein the connecting point is located closer to the  
20           first direction than the feeding point.

          4. The antenna apparatus according to claim 1, wherein the physical length of the linear element ranges from a one-sixth wavelength to a one-fifth  
25           wavelength.

          5. The antenna apparatus according to claim 1, wherein the linear element is aligned with the

half-wave element inside the conducive piece.

6. The antenna apparatus according to claim 1, wherein the linear element and the half-wave element cross at right angles inside the conducive piece.

5           7. The antenna apparatus according to claim 1, wherein a cross-sectional area of the conductor piece is larger than that of the linear element.

8. The antenna apparatus according to claim 1, wherein a lateral area of the conductor piece per unit  
10 length is larger than that of the linear element per unit area.

9. The antenna apparatus according to claim 1, wherein the conductor piece is spherical.

10. The antenna apparatus according to claim 1, wherein the conductor piece is shaped like a square-  
15 pole.

11. The antenna apparatus according to claim 1, wherein the conductor piece is cylindrical.

12. The antenna apparatus according to claim 1, wherein the conductor piece comprises a conductive part  
20 on a surface thereof and another internal non-conductive part.

13. The antenna apparatus according to claim 1, further comprising a dielectric inserted between the  
25 conductor piece and the cavity.